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भारतीय मानक

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Indian Standard

RUST CONVERTERS — SPECIFICATION

UDC 667·648·2

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 1992

Price Group 1

Corrosion Protection Sectional Committee, MTD 24

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Corrosion Protection Sectional Committee had been approved by the Metallurgical Engineering Division Council.

Rust converters are chemicals dissolved in aqueous or non-aqueous media which when applied on rusted surfaces free from loose rust, converts the adherent rust into a protective coating generally resulting in the formation of oxides of iron and phosphates. The converted surface acts as a good base for paint. These rust converters can be used both in the shop and in the field for pretreatment of the structures including the erected once which could not be cleaned by other methods.

Painting is the most common and major method of controlling corrosion of iron and steel structures exposed to various environmental conditions. The successful performance of a protective system to a large extent depends on the surface treatment of the base.

Surface preparation methods can be broadly divided into mechanical and chemical methods. Mechanical methods that are used for removing rust and scale in the field consist of wire brushing, chiselling, flame cleaning, and sand blasting. Mechanical methods except sand blasting are not satisfactory, as incomplete removal of rust and scale results in premature paint failure. Therefore chemical methods of surface preparation with suitable modification are being suggested. The pretreatment processes produce chemical change on metal surfaces which improve the protective value of paint schemes applied over them. These treatments produce an adherent surface film of insoluble metal compounds generally oxides and phosphates. These are known as rust converters as they convert the rust into an adherent black coating of oxides of iron and mixed metal phosphates.

The rust converter solution is applied on the rusted surface, whose loose rust has been removed by wire brushing, where the reaction between the metal surface and solution results in the formation of an adherent coating which becomes a good base for paint and also dispenses with the surface preparation step. This also gives temporary protection before application of paint.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

RUST CONVERTERS — SPECIFICATION

1 SCOPE

1.1 This standard covers requirements for rust converter coatings applied on rusted mild steel products fabricated or assembled from cast, rolled, pressed or forged shapes, such as structural steel sections, plates and bars which are to be protected subsequently by organic/inorganic coatings.

2 METAL SURFACE

2.1 The loose rust present on the base metal removed by wire brushing. The surface, thus, should have a uniform rusting all over. Conversion will not take place in the case of partially rusted surface and on the surface with mill scale. Contamination of the surface with oil, grease, etc is to be avoided.

3 RUST CONVERTER

3.1 The rust converter solution is prepared as agreed upon between the user and the supplier. It may be a single pack or two pack system.

3.2 Application

The converter solution is applied on the cleaned rusted surface by branch and allowed to react for 20-30 minutes. The solution reacts with the surface and finally gives a coating containing oxides and/or phosphates or other metal complexes.

3.3 Drying

The coating normally dries in 60 minutes and the coating is usually grey, black, blue and violet.

3.4 Application of an Organic Coating

An organic coating should be applied on the dry converted surface, as agreed upon for complete protection of the structure from corrosion.

3.5 Keeping Quality

When stored under normal conditions for 12 months in air tight containers and sealed packets, the material shall conform to all the requirements of this specification.

4 TEST CONDITIONS

4.1 Test shall be made under temperature conditions 30° ± 2°C and a relative humidity as 60 ± 5%. The solution should be applied on dry surface. Rusted panels of sizes 3″ × 2″ and 6″ × 4″ are used for the test.

4.1.1 The surface should be made free from loose rust by wire brushing.

4.1.2 The solution should be applied on the cleaned surface and allowed to react. A coloured coating other than the original one appears.

4.1.3 All the tests may be carried out in triplicate.

4.2 Tests

4.2.1 *Drying Time*

The solution should be applied on the cleaned surface by brush to cover the whole area uniformly without sagging. It shall completely dry when exposed to the natural conditions in 60 minutes.

4.2.2 *Acid Leach Test*

The rust converted steel plate is immersed completely in a glass beaker containing distilled water. After one hour, the *p*H of the solution was measured.

4.2.2.1 The *p*H of the solution shall be between 4.5 to 5.

4.2.3 *Adhesion Test*

The rust converted steel panel is placed on a flat surface in horizontal position. Large number of squares are made on the surface by using a sharp needle. A strip of cellotape to cover the scratched area is placed over the panel. A piece of felt is placed on the tape and 1 kg weight is placed on the felt pad. After one hour, the weight and the felt are removed and the cellotape stripped rapidly from the surface of the coated panel.

4.2.3.1 The cellotape should come off without dislodging the coating.

4.2.4 *Scratch Test*

The scratch test is done employing Sheens automatic scratch tester. The rust converted steel plate is mounted on the sliding panel. A 1 000 gm weight is placed on the needle holder which has provision for weights. The needle is lowered on to the test panel and a scratch approximately 6 cm long is produced and the scratch is examined for visual appearance of the base metal.

4.2.4.1 The base metal should not be visible.

4.2.5 *Resistance to Temperature*

Rust converted samples are placed in a drying oven kept between 75 and 80°C for 60 minutes and the surface is examined.

4.2.5.1 No change should be observed on the surface.

4.2.6 *Immersion Test*

Immersion test is carried out with 3″ × 2″ rust converted panels dipped in distilled water at room temperature with and without painting (Primer alone and primer + Finishing paint) for 30 days.

4.2.6.1 No rusting shall be observed at the end of test period.

4.2.7 *Salt Spray Test*

Rust converter applied panels of size 6″ × 4″ with and without painting are subjected to 3 percent sodium chloride salt spray test in a salt fog corrosion testing chamber for 30 days.

4.2.7.1 No rusting shall be observed at the end of the test.

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